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sented furthermore corroborates in a striking manner the findings of Lillie (l.c.) and Chapin<sup>8</sup> that the hormone influence makes itself felt in the earliest stages of sex differentiation. That this must be so is proved by the fact that this animal is born ten days after fertilization and five days after the primitive streak stage.

Again, since in the specimen the cortex of the gonad is seen to be entirely absent we have here a confirmation of Lillie's statement that the gonad of the zygotic male, not possessing the homolog of the cords of Pflüger, is capable of less transformation than the embryonic ovary.<sup>9</sup> The absence of male sex cells in the specimen and the presence of healthy tubules (probably Sertoli cells only) is precisely in keeping with the theory of the influence of the female hormone in fetal life.

The assumption of certain embryologists that the embryo in the undifferentiated stage is a true hermaphrodite, is, therefore, no longer tenable.

More crucial evidence in favor of the view expressed above is, however, furnished by the following human case described by Eschricht.<sup>10</sup> It concerns a sex-intergrade which in all essentials was an exact counterpart of the opossum described above: externally, penis and empty scrotum; internally, uterus, Fallopian tubes with fimbriæ, and atypical "ovaries." It was a reciprocal free-martin, who, because of other malformation, died a few minutes after birth. The significant facts, however, in this human case are: (1) that *the child was born co-twin to a normal female* who lived and (2) that *the placenta were fused* ("sehr genau verbunden"). Better proof could hardly be desired. I refrain from mentioning other human cases that must be interpreted as reciprocal free-martins, as, e. g., those cited by Simpson.<sup>11</sup>

<sup>8</sup> Catherine L. Chapin, *Jour. Exp. Zool.*, 23, 1917, 453-482.

<sup>9</sup> Lillie, l. c., page 419.

<sup>10</sup> Eschricht, *Müller's Archiv*, 1836, 139-144.

<sup>11</sup> Sir J. Y. Simpson, article "Hermaphroditism" in Todd's *Cyclopædia of Anat. and Physiol.*, 1836-39.

From the same article by Simpson it seems clear that the true free-martin also occurs in man. Such cases the author classifies with the free-martin of cattle, showing that he correctly interpreted them. This occurrence of both types in the same form (man) need constitute no great obstacle to the hormone theory, for it is quite conceivable that sometimes the male, sometimes the female co-twin gets the start in development, since the handicap need be very slight to prove ruinous to the laggard.

That the free-martin also occurs in rare instances in the dog, a multiparous animal, seems probable, since the "hermaphroditic dog" described by Home<sup>12</sup> in an apparently forgotten article is almost certainly a free-martin of the cattle type. In this connection the case of fused placenta of the dog embryos found by Dr. Evans and cited above is of more than passing interest.

Free-martins, reciprocal free-martins and intermediate conditions may, therefore, be expected to occur in all mammals. The principle of hormone influence in fetal life, first demonstrated by Lillie,<sup>13</sup> constitutes the most important contribution to the subject as yet made. Twins and double monsters will have to be reclassified in the light of the theory<sup>14</sup> and such monographs as those of Sauerbeck and of Hübner<sup>15</sup> will have to be largely rewritten.

A more complete paper will be published later.

CARL G. HARTMAN

THE UNIVERSITY OF TEXAS

# THE NEBRASKA ACADEMY OF SCIENCES

THE Nebraska Academy of Sciences held its thirtieth annual meeting at Deane College, Crete, Nebraska, on April 30 and May 1. The plan is to meet in Lincoln every other

<sup>12</sup> Everard Home, *Phil. Trans. Roy. Soc.*, 1799, 162.

<sup>13</sup> See F. R. Lillie, *SCIENCE*, N. S., 50, 1919, 183-184.

<sup>14</sup> Cf. E. Steinach, *Archiv f. Entwicklungsmech.*, 42, 1916, 307-332.

<sup>15</sup> *Ergebn. d. allg. Path.*, 15, 1911.

year and at some other point in the state on alternate years. Usually the attendance is larger when the meetings are held in Lincoln as so many members are connected with the university and the Lincoln colleges. When held outside of Lincoln, there are usually interesting field trips and the smaller number makes possible a closer personal contact.

On Friday evening, the members were served the evening meal by the domestic science class. For the other meals, tables were set apart for the academy members at the college dining hall.

Following is the program:

*Friday, 1:30 P.M.*

*Notes on the anatomy of Okapia johnsoni:* H. V. VON W. SCHULTE.

*The two classes of sperm in Rotifers:* D. D. WHITNEY.

*The use of the aeroplane in studying vegetation:* P. B. SEARS.

*Equisetum gametophytes in Nebraska; A new species of Obedokonium:* EDNA R. WALKER.

*Root systems of cereal crops in the grassland formation:* J. E. WEAVER.

*Dissemination of fungi with special reference to that of Sphaerobolus and related forms:* LENA B. WALKER.

*Pioneer tales from southeastern Nebraska. A sketch of Nebraska's early newspapers:* UNICE HASKINS.

*More western traditional songs:* LOUISE POUND and ELEANOR BURKETT.

*Racial elements in Nebraska population:* A. E. SHELDON.

*A scientific study of Czechoslovakia:* ROSE B. CLARK.

*The psychological clinic in practice:* G. W. A. LUCKEY.

*6 P.M.*

Banquet and social hour.

*8 P.M.*

*President's annual address, climate and evolution (illustrated.)*

*Saturday, 9 A.M.*

Business Session.

*10 A.M.*

*Some lessons in fuel conservation:* J. C. JENSEN.

*Some investigations in the transmission of heat through boiler tubes:* JILES W. HANEY.

*Development of the telephone:* V. L. HOLLESTER.

*Light and gravitation:* H. H. MARVIN.

At the business meeting final action was taken to affiliate with the A. A. A. S. and plans made to better organize the science work of the state. The following officers were elected:

OFFICERS

DR. ELDA R. WALKER, *President.*

PROFESSOR A. J. MERCER, *Vice-President.*

PROFESSOR W. F. HOYT, *Secretary.*

DR. G. W. A. LUCKEY, *Treasurer.*

Lincoln Academy of Medicine.

DR. E. G. ZIMMERER, *Secretary.*

The executive committee held a meeting in Lincoln on August 28 and planned a campaign for membership. Members of the A. A. A. S. and of the N. A. S. will be invited to come in under the affiliated membership plan if they have not already done so. The final arrangements were made for the affiliation of the Lincoln Academy of Medicine with the N. A. S. The president announced the following appointments for sectional vice presidents:

SECTIONAL VICE-PRESIDENTS

*Biological and Medical Science,* DR. R. A. LYMAN.

*Mathematical and Physical Science,* PROFESSOR J. C. JENSEN.

*Ethnology and Folklore,* DR. LOUISE POUND.  
*Engineering,* PROFESSOR GEORGE R. CHATBURN.

*Earth Science,* PROFESSOR N. A. BENGTSON.  
C. O. CARLSON

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